

Serial No. 09/890,807
Reply to Office Action of April 20, 2004

REMARKS

Responsive to the Office Action mailed April 20, 2004, Applicants have studied the Examiner's comments and the cited art. Claims 1-9 and 11-13 are currently pending. In view of the following remarks, Applicants respectfully submit that the application is in condition for allowance.

Claim Rejections Under 35 U.S.C. § 112

Claims 1-9, and 11-12 are rejected under 35 U.S.C. § 112, first paragraph and 35 U.S.C. § 112, second paragraph. Applicants respectfully traverse the rejections.

Attorney for Applicants and the Examiner held a telephonic interview on June 21, 2004. The rejections under 35 U.S.C. § 112 were considered, but no agreement was reached. Examiner Gilman pointed to the Office's Supplemental Examination Guidelines for Determining the Applicability of 35 U.S.C. § 112, para. 6, as published in the Federal Register on June 16, 2000 (the "Guidelines") in support of the rejections.

Applicants have reviewed the Supplemental Guidelines, which do not have the force of law. The Office Action asserts that the "means for" claim language is indefinite because the specification does not expressly recite a description of what structure is to be interpreted as the "means for ensuring" or the "means for locking." Applicants respectfully disagree.

Contrary to the Office Action's position, neither the statute nor the Guidelines, which do not have the force of law, require express language in the Specification specifying which elements comprise the corresponding structure for "means for" language in the claims. Rather, as the Guidelines recognize, the specification may implicitly disclose the corresponding structure, such that one of ordinary skill in the art would recognize what structure or material performs the claimed function. Nevertheless, Applicants clarify for the record below, as previously expressed in the telephonic interview of June 21, 2004, the corresponding structure disclosed in the Specification for those "means for" elements.

Referring to Claim 1, two examples of the corresponding structure for the "means for ensuring that on interengagement the contact holder is not displaced from the first to the second position unless the third contact is interconnected with a contact of the other connector element" are elements 16, 6, and 7 and elements 31, 20, and 21. These elements are best illustrated by Figure 2, and described on pages 3 to 4 on the specification. Elements 16 and 31 are lock balls that retain either sliding contact holder 4 and 30 in position until contacts 15 and 34 have connected. Elements 6 and 20 are sliders, which in a first position retain lock ball 16 and lock ball 31 such that sliding contact holders 4 and 30 cannot move. Elements 7 and 21 are compression springs, resiliently biasing sliders 6 and 20, respectively.

One example of the corresponding structure for the "means for ensuring that on disengagement the contact holder is displaced from the second to the first position" comprises lock ball 33 and the corresponding recess for lock ball 33 in contact holder 4. The recess is not

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specifically labeled, although Applicants will submit an amendment to add a reference number for that recess upon request. However, lock ball 33 can be seen located in the recess in, for example, Figure 4. The function of the lock balls 33 is described in the specification at page 6, lines 5-7 and 25-30, among others.

Lock ball 33 also is one example of the corresponding structure for the "means for ensuring that on disengagement the first and second contacts separate before the third contact is separated from the corresponding contact of the other connector element." Once the first and second connector elements are connected together, lock ball 33 prevents sliding contact holders 4 and 30 from separating until both pin and socket connections 12 and 14 and 35 and 36 have disengaged.

The Specification also describes alternative arrangements to those described above, such as replacing locking balls with sliding rods or the like.¹ However, these alternative arrangements do not remove the disclosure of structure corresponding to the respective "means for" elements described above, but merely recite additional structure that can be used in the alternative for the disclosed structure identified above.

The Specification therefore provides the corresponding structure for and provides adequate support for the claimed "means for ensuring that on interengagement the contact holder is not displaced from the first to the second position unless the third contact is interconnected with a contact of the other connector element," the "means for ensuring that on disengagement the contact holder is displaced from the second to the first position," and the "means for ensuring that on disengagement the first and second contacts separate before the third contact is separated from the corresponding contact of the other connector element," in terms that would be understood as such to one of ordinary skill in the art. For these reasons, Applicants respectfully request withdrawal of the rejections.

Claim Rejections Under 35 U.S.C. § 102

Claims 1 and 5 are rejected under 35 U.S.C. § 102(b) as being anticipated by Bac, U.S. Patent No. 3,360,764. Applicants respectfully traverse the rejections.

In order to clarify the sequence of events during connection and disconnection of the first and second interchangeable connector elements the following comments may prove helpful.

The lock ball 31 cannot release and move away from the female connector sliding contact holder 30 until the female connector slider 20 has moved far enough against the biasing force of the spring 21 and until contacts 15 and 34 have engaged. Only after contacts 15 and 34 have engaged has slider 20 moved sufficiently far to allow lock ball 31 to move out of contact with female connector slider 20. At the point at which lock ball 31 releases, lock ball 16 continues to prevent axial movement of sliding contact holder 4. Lock ball 16 does not release until contacts 35 and 36 have connected.

¹ See Specification, p. 8-9.

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Upon disengaging the first and second connector elements, lock ball 33 keeps sliding contact holder 4 and sliding contact holder 30 locked together, retaining engagement of contacts 15 and 34. Lock ball 33 only releases once contacts 12 and 14 and contacts 35 and 36 have released. Only after these contacts have released does lock ball have sufficient space to move radially outwards into the adjacent recess (not labeled, but as stated above, Applicants will submit a drawings amendment upon request) and thus allow separation of the two sliding contact holders.

Even if the connector of Bac *can* disconnect in the desired order, Bac fails to recite a structure that *ensures* such an order, as required by claim 1. This claim limitation cannot simply be ignored. In the telephonic interview of June 21, 2004, the Examiner requested further arguments showing that the Bac connector fails to ensure connection and disconnection in the desired order under conditions that were not extreme or highly unlikely, agreeing that such arguments would be received favorably.

First, the connector of Bac depends upon one part of the connector being fixed in a wall. The connector comprises a fixed part A, "intended to be mounted in an aperture provided in the outside wall 2 of [a device], and a movable part B." Bac refers to these fixed and movable parts as "fundamental parts of the apparatus."² Connection of parts A and B of Bac depends upon the presence of wall 2:

The collar 40 of the ring 39 of the body 28 is applied against the wall 2 of the device and then, as the insertion movement continues, the connecting pins 36 of part B are engaged in the female connecting parts 26, the ring 39 being pushed back on the body 28 against the action of the spring 42 until the front edge of the widened portion 29 of the body 28 strikes against the collar 1 of the sleeve 15 of the part A.³

Applicants' connector is not so limited, but can be used for interconnecting two or more circuits, without either part being fixed in an aperture of a device, as in Bac.

Second, the Bac connector fails to ensure the desired connection and disconnection sequence, because the connector depends upon spring forces to cause disconnection to occur in the desired order. The relative spring strength of springs 42 and 18 are critical to the disconnection sequence. Should, for example, spring 18 have a lesser strength than spring 42, parts A and B may disconnect in an undesired order, allowing disconnection of pins 36 from female connecting parts 26 prior to disconnection of pins 25 from female connecting parts 13. Springs are known to lose their strength over time, even if upon initial construction the relative spring strengths caused the desired sequence. Thus, gradual weakening of springs can allow an undesired sequence to occur. Likewise, if spring 42 is stronger than spring 18, connection may

² Col. 7, lines 21-26.

³ Col. 6, lines 31-38.

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occur first between pins 25 and female parts 13 prior to connection of pins 36 with female parts 26.

Further, the connector of Bac fails to ensure the desired connection and disconnection sequence in the presence of foreign objects. In actual use, dirt or other foreign substances may come between the fixed and movable parts A and B of Bac, or may coat, block, or otherwise interfere with pins 36 or female connecting parts 26. Such foreign objects can then cause disconnection or connection in an undesired order, potentially causing sparks or other unsafe ignition events, such as by moving sleeve 15 and block 21 before engagement of pins 36 at connection. In addition, a bent pin, which would prevent successful connection of movable part B with fixed part A, may at the same time cause movement of the sleeve 15 and block 21, causing engagement of pins 25 with female connecting parts 13. Bent pins and foreign objects are easily foreseeable and likely in actual use of the connectors.

In addition, high current flow through the connectors can cause one or more of the pins to weld or fuse to its corresponding female part. Should one of pins 26 fuse or electrically weld to a corresponding female connecting part 13, the spring action of springs 18 and 42 would not ensure disconnection of the pins 25 before disconnection of pins 36, thus allowing a dangerous live disconnection of pins 36 in the open space between parts A and B.

In contrast, the locking mechanism of Applicants' claimed subject matter ensures that the connectors cannot disconnect or connect in the wrong order. The locking mechanism of Applicants' claimed subject matter does not depend upon relative spring forces, the presence of an intervening wall in which one part of the connector is mounted, upon the absence of foreign matter. Nor would fusing of pins allow disconnection in an improper order. Thus, Applicants' claimed subject matter is not anticipated by the connector of Bac. For these reasons, Applicants respectfully request reconsideration and withdrawal of the rejections.

Claim 5 depends from allowable claim 1 and is therefore also allowable. For at least this reason, Applicants respectfully request reconsideration and withdrawal of the rejection.

Claim Rejections Under 35 U.S.C. § 103

Claims 2-4, 6-8, and 11-13 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Bac, U.S. Patent No. 3,360,764. Applicants respectfully traverse the rejections.

Claims 2-4, 6-8, and 11-13 depend from allowable claim 1 and are therefore also allowable. For at least this reason, Applicants respectfully request reconsideration and withdrawal of the rejections.

CONCLUSION

Applicants respectfully submit that all issues and rejections have been adequately addressed, that all claims are allowable, and that the case should be advanced to issuance.

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If the Examiner has any questions or wishes to discuss the claims, Applicants encourage the Examiner to call the undersigned at the telephone number indicated below.

Respectfully submitted



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Date: 7/20/2004

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